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microfilaments that cover the surface of the fiber bundle. The term "bulked" generally refers to an increase in the volume of the filaments. This increase in filament volume can exhibit itself as a substantially random series of curls or loops within the non-elastomeric microfilament, as shown in Figure 2 of the application as filed.

The volume of the non-elastomeric microfilaments is increased by drawing or stretching the multicomponent fiber beyond the elastic limit of the non-elastomeric component and subsequently releasing and splitting the multifilament fiber under conditions of low or substantially no tension. The plastically deformed, non-elastomeric components can exhibit an unrecoverable increase in length relative to their original undrawn length of up to 600%. Conversely, the drawn elastomeric microfilaments return to substantially their original length upon relaxation of the draw forces and subsequent splitting. The longer plastically deformed non-elastomeric microfilaments bunch or bulk up around the relaxed elastomeric microfilaments to span the same end-to-end distance as the contracted elastomeric strands, thereby yielding a self-bulked fiber bundle.

The claimed fibers further provide a more highly bulked fiber bundle than traditional splittable multicomponent fibers, because the claimed fibers and fiber bundles are separated using a thermal treatment. Conventional means by which to separate multicomponent fibers to date include applying physical force to the composite fiber, such as by needle punching or hydroentangling, or by dissolving a component out of the composite fiber. However, striking the composite fiber during the separation process decreases the bulk, and consequently the pleasant feel, of the resulting component filaments.

Claims 17 through 25, 28, 30 through 33, 63 and 65 are rejected under 35 USC § 102(b) as anticipated by U.S. Patent No. 4,663,221 to Makimura et al. Applicants respectfully traverse this rejection.

In contrast to the present invention, Makimura is directed to composite fibers that are separated by dissolution. More particularly, Makimura et al. is directed to a composite fiber construction that includes an elastomeric core surrounded by a sea-island component. The island component is a non-elastic fiber forming polymer surrounded by a soluble polymer as the sea

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component. Alternatively, the elastomeric core is surrounded by a non-elastic fiber forming polymer and soluble polymer occurring radially and alternatively. See the '221 patent, Col. 2, lines 12 - 20. Following fabric formation, solvent dissolves the soluble polymer out of the composite fiber to leave an elastomeric core filament surrounded by smaller denier non-elastic filaments. See the '221 patent, Col. 2, lines 55 - 59 and Col. 5, lines 10 - 31.

Applicants reiterate that the products of Makimura et al. differ structurally from the claimed invention. As noted by the Examiner in the Office Action dated November 7, 2001, Makimura's elastomeric and non-elastomeric components are prevented from completely surrounding the other component. (Paper No. 10, Page 6, 2<sup>nd</sup> full paragraph, 4<sup>th</sup> sentence). In contrast, the non-elastomeric microfilaments of the claimed invention substantially surround the elastomeric microfilaments. In fact, the non-elastomeric microfilaments of the claimed fiber bundles surround the elastomeric microfilaments to such an extent that the elastomeric microfilaments are covered from view. The elastic core of Makimura is clearly visible, as shown in Figure 4.

Makimura further does not provide the bulked, e.g. curled or looped, non-elastomeric microfilaments of the claimed invention. The lack of bulky non-elastomeric filaments is reflected in the fact that the fabrics of Makimura must be surface napped to impart a soft feel and touch. See the '221 patent, Col. 3, lines 14 - 17. In contrast to the claimed bulked microfilaments, Makimura merely produces "slack" non-elastic fibers following separation. See the '221 patent, Figure 4 and Col. 5, lines 34 - 37. The slack within the fibers may be imparted by means such as a shrinking treatment or removing the soluble component. See the '221 patent, Col. 5, lines 5 - 8 and 32 - 46.

Rather than merely being "slack", the recited plastically deformed, non-elastomeric components of the present invention are capable of exhibiting an unrecoverable increase in length of up to 600%. Such unrecoverable increases in length manifests itself as the bulked non-elastomeric microfilaments of the claimed invention. The separated fiber of Makimura thus does not provide the recited fiber bundle that includes a plurality of bulked, e.g. looped or curled, non-elastomeric microfilaments, as provided in the claimed invention.

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Accordingly, Applicants respectfully submit that Claims 17 through 25, 28, 30 through 33, 63 and 65 are patentable in light of Makimura, considered either alone or in combination with the art of record.

Claims 17 through 25, 28, 30 through 33, 48 through 59, 63 through 65, 67 through 75 and 82 through 88 are rejected under 35 USC § 102(b) as anticipated by U.S. Patent No. 5,783,503 to Gillespie et al. Applicants respectfully traverse this rejection.

Gillespie is generally directed to spunbonded fabrics formed from composite fibers in which the surface energies of the components are selected to promote fiber separation. See the '503 patent, Col. 2, lines 25 - 28 and lines 43 - 48. Gillespie provides a laundry list of polymers from which to form the components. See the '503 patent, Col. 5, lines 17 - 21. Although briefly noting that his fibers may be used to form textile yarns and tow, Gillespie expressly states that continuous filaments formed in accordance with his invention are of low orientation. See the '503 patent, Col. 2, lines 38 - 42.

Consequently, Gillespie does not teach or suggest post-extrusion draw processes, known in the art to impart a high degree of orientation. Any orientation induced in Gillespie would thus occur during extrusion, as the molten polymer issues from the die. Due to the elevated temperatures and associated rheologies involved, the morphological properties induced by extrusion drawing are different than those imparted by post-extrusion draw processes, which are performed at much lower temperatures (generally around or slightly above the glass transition temperature of the polymer). For example, both the elastomeric and non-elastomeric components within a multicomponent fiber would undergo plastic deformation during extrusion drawing.

Gillespie would thus produce components which are either (a) both plastically deformed; (b) both elastically deformed or (c) have no deformation depending on whether the multicomponent fiber is (a) split by attenuation during spinning; (b) split by an air texturizing jet process following spinning or (c) split during free fall or triboelectric charge during spinning, respectively. However, it is the combination of elastically and plastically deformed multifilaments that gives rise to the differential lengths and resulting bulking within the claimed

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fiber bundles. Photographs of Gillespie's split fibers illustrate this lack of differential deformation between the fiber components. More specifically, Gillespie's photographs indicate that the fiber components have substantially identical lengths after splitting. See the '503 patent, Figures 5, 6, 8, 10, and 11. Consequently, Gillespie does not teach or suggest the recited fiber bundles including elastomeric microfilaments that are shorter than and less bulky than the bulked non-elastomeric microfilaments.

Accordingly, Applicants respectfully submit that Claims 17 through 25, 28, 30 through 33, 48 through 59, 63 through 65, 67 through 75 and 82 through 88 are patentable in light of Gillespie, considered either alone or in combination with the art of record.

Claim 27 continues to stand rejected under 35 USC § 103 as unpatentable over Makimura et al. or Gillespie et al. The Office Action proffers that it would have been obvious to die a fiber different colors. However, there would have been no motivation to die the various components of Makimura or Gillespie different colors. Even if one had died Makimura or Gillespie, the present invention would not result. Claim 27 recites yarns that have a first color in an unstretched condition and a different color upon stretching. The color difference arises from the fact that the bulked plastically deformed non-elastomeric microfilaments substantially surround and cover from view the elastomeric microfilaments when the yarn rests in an unstretched condition. Upon stretching, the elastomeric microfilaments become visible, changing the color of the yarn. As discussed above, neither Makimura or Gillespie produce fiber bundles or yarns having bulked plastically deformed non-elastomeric microfilaments that substantially surround and cover from view the elastomeric microfilaments. Consequently, Claim 27 is patentable in view of both Makimura and Gillespie.

Claims 76 through 79 are rejected under 35 USC § 103 as unpatentable over Gillespie in view of Pike. As noted above, Gillespie is generally directed to spunbonded fabrics formed from composite fibers in which the surface energies of the components are selected to promote fiber separation. Pike does not cure the deficiencies in Gillespie. Pike is generally directed to nonwovens produced from multicomponent fibers possessing latent helical crimp. Consequently, Pike does not teach or suggest splittable fibers, much less splittable fibers having

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an elastic polymer component and a plastically deformed non-elastomeric polymer component which is longer than the elastomeric component, as recited in the claimed invention.

There further would have been no motivation to have combined Gillespie and Pike. However, even if Applicants had combined Gillespie and Pike, the present invention would not have resulted. Neither Pike nor Gillespie, considered either alone or in combination, teaches or suggests multicomponent fibers having a non-elastomeric polymer component which is plastically deformed and longer than the elastomeric component, as recited in the claimed invention. Accordingly, Applicants respectfully submit that Claims 76 through 79 are patentable in light of Gillespie and Pike.

Claims 79 through 81 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Gillespie in view of Hagewood, "Ultra Microfibers: Beyond Evolution." For the reasons given above, Claims 79 through 81 are patentable in light of Gillespie, considered either alone or in combination with the art of record.

### CONCLUSION

The rejections of record having been addressed in full in the foregoing, Applicants respectfully submit that this application is in condition for allowance, which action is respectfully solicited. Should the Examiner have any questions regarding the foregoing, it is respectfully requested that she contact the undersigned at her convenience.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required

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therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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## CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to Examiner Jenna Befumo at the Patent and Trademark Office at facsimile number (703) 872-9311, on the date shown below.

Janet F. Moore

(Type or print name of person signing certification.)

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Date